

Communications - Electronics

COMMUNICATIONS

This regulation prescribes concepts, policies, and standards which govern the Civil Air Patrol (CAP) Communications Program. The National Commander prescribes the minimum communications requirements. Practices, procedures, and standards prescribed in this regulation are mandatory. All suggestions for modification and improvement of the program will be forwarded through the chain of command to HQ CAP/DOK.

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Chapter 1

GENERAL INFORMATION

1-1. Mission. The mission of the Civil Air Patrol (CAP) Communications Program is to organize and maintain a reliable, nationwide, point-to-point, air-to-ground, and ground mobile radio capability in support of the missions of CAP.

a. Emergency Services. The primary user of the CAP Communications System. Most support provided to this function is tactical in nature requiring the highest degree of flexibility.

b. Cadet Programs. Not only a prime training ground for tomorrow's leaders, but also a contributor of today's mission ready assets. Support provided to this function is both tactical and administrative in nature.

c. Aerospace Education (AE). While not as heavy a user of the CAP Communications System, AE is no less important. As one of our congressionally-chartered missions, it plays an important part in the overall mission of CAP. Support to this function is primarily administrative in nature.

1-2. Purpose. The primary purpose of any CAP communications facility is to provide the commander with the means for controlling his/her units and their activities. In addition, it provides the commander at each echelon the ability to communicate with superior and subordinate commanders.

1-3. Utilization. Communications facilities of CAP are used in support of many operations including:

a. Emergencies. To provide radio communications support for search and rescue, emergency preparedness, and disaster relief missions; to augment existing communications services in the event of floods, fire, tornado, and other natural disasters and to support the US Air Force.

b. Flying. To provide messages on CAP aircraft movements, aircraft landings, and other communications related to the safety of lives and property. This category also includes ground-to-air communications with in-flight aircraft.

c. Administration. To provide day-to-day support of CAP's administrative functions.

d. Training. To provide familiarization and practice courses in CAP radio communications procedures and to demonstrate techniques of air-to-ground and point-to-point operations.

e. Support to Other Agencies. In support of interagency agreements or memorandums of understanding (MOU) with other federal, state, and local agencies.

1-4. Principles. To be effective in accomplishing its mission, our communications system must follow certain

principles. These principles are the characteristics of a good communications system and are, therefore, our guiding criteria for the planning and operation of our communications systems, networks, and facilities. These principles are survivability, reliability, flexibility, maintainability, speed, and security.

a. Survivability. In many instances, CAP goes to work when more routine portions of our social infrastructure are failing or are overtasked. For this reason, our communications systems must be planned to survive when other communications fail. Emergency power, backup antennas, and standby stations are all good examples of planned survivability.

b. Reliability. This principle has two applications. They are (1) the dependability of a system, i.e., its failure rate; and, (2) the accuracy of the system, i.e., the amount of corruption that occurs to information sent through the system. The reliability of a communications system is derived from its structure, organization, and adherence to standards in operating procedures.

c. Flexibility. This is the ability to meet changing situations and operations with minimum disruption or delay. Flexibility is achieved through good system design, positioning of assets, and personal initiative (the ability to think under pressure).

d. Maintainability. This, of course, implies the status of the equipment, but also includes the readiness of the system operators to perform their duties. Therefore, both regular preventative equipment maintenance and operator training contribute positively to this communications system characteristic.

e. Speed. The quick movement of critical operations traffic and the vast bulk of support traffic is a continual and ever-present challenge. Delays caused by bad operating practices, improper or incorrect training, violations of established procedures, mismanagement, or poor system design must be kept to a minimum.

f. Security. This is the protection resulting from all measures designed to deny unauthorized persons access to sensitive information being transported through our communications system. Security procedures often require the sacrifice of some speed and, occasionally, reliability. But, under emergency conditions, the importance of speed sometimes outweighs the need for security. When the two conflict, the commander must decide which takes precedence.

1-5. Network Structure. Only through planned organization and proper utilization can a communications system function to its maximum potential. In voice networks, that organization is achieved through correct application of directed nets and free nets. Network structure is implemented by Net

Control Stations (NCS) and Alternate Net Control Stations (ANCS).

1-6. National Digital Radio Network (NDRN) Manager. This officer manages the CAP National Digital Radio Network. This is primarily a planning function which oversees the development and growth of the network but is also active in solving network problems and conflicts.

a. Appointed by NHQ/DOK. Coordinates all actions with that office.

b. Works closely with the region and wing digital communications coordinators.

1-7. Maintenance, Testing, and Measurements of Radio Communications Equipment. Since the communications and electronics knowledge of the average CAP radio operator is normally limited to proficiency of radio operations, the recruitment of technically qualified personnel is highly encouraged. All transmitter installation, servicing, testing, or maintenance adjustments for operation which may affect the proper operation of the station shall be made by, or under the immediate supervision and responsibility of a qualified technician.

a. The minimum standard for qualification will be a General Radiotelephone Operator License or equivalent certification. The National Association of Business/Emergency Radio (NABER) certificate, Association of Public Safety Communications Officers (APCO) certificate, or Society of Broadcast Engineers (SBE) certificate are examples of acceptable certification. Persons in certain military specialties may also be authorized to service CAP communications equipment. These persons shall be authorized by the wing director of communications or higher.

b. All maintenance personnel, authorized under this regulation, shall be responsible for the proper functioning of station equipment serviced by, or under their direct supervision.

1-8. Definition of Terms.

a. **National Telecommunications and Information Administration (NTIA).** The federal agency responsible for the regulation and coordination of telecommunications among federal agencies. CAP radio communications fall under this authority.

b. **Standard Frequency Action Format (SFAF).** This format replaces the FCC application in the NTIA. This format should be filed by wing level or higher to receive authorization on any frequency.

c. **Types of Stations.** There is a need to align CAP terms with NTIA usage. NTIA and the International Telecommunications Union (ITU) use station class based on HOW the equipment is being used, NOT on its operating band, operating function, or service. The following are examples that could be used within CAP:

FA - A ground station that communicates with an aircraft.

FB - A ground station that communicates with mobiles (both hand helds and vehicle mounted).

FC - A ground station that communicates with a ship.

FX - A point-to-point communication.

MA - An aircraft communicating with another aircraft.

ML - A mobile communicating with another mobile.

MS - A ship communicating with another ship.

MO - This is a shorthand expression for combining the previous three station classes in the same SFAF.

TT - A ground station communicating with a satellite (such as ATS-3).

"R" - May be added to any station class if the equipment functions as a repeater.

The foregoing terms are what frequency managers use. The operational community may use such terms as search and rescue (SAR) station, command station, mission station, or a net control station. These are useful to know and these may be documented in a remark field of the SFAF.

d. **Nets.** Nets are composed of stations selected based on the purposes of the individual net. Some nets restrict open participation, while other nets are open to all communicators.

e. **Directed Nets.** Directed nets require strict adherence to procedures. Stations obtain permission from the net control station prior to communicating with other stations in the net. Directed nets generally follow published schedules.

f. **Free Nets. Free nets allow relaxed procedures.** The net control station (NCS) authorizes member stations to transmit traffic to other stations in the net without obtaining prior permission. Free net operation does not relieve the NCS of the responsibility for maintaining net discipline.

g. **Net Control Station.** The net control station (NCS) is responsible for net discipline. The NCS controls and directs the flow of traffic in the net. NCS are authorized by region/wing.

h. **Alternate Net Control Station.** Alternate net control stations perform the same function and have the same responsibilities as the NCS when the appointed NCS is unable to run the net.

i. **Provisional Net Control Station.** When the NCS or ANCS must leave the air during a net, he/she appoints a provisional net control station to maintain discipline and conduct the net. The NCS or ANCS will officially relieve the provisional NCS upon his/her return to the net.

j. **Ground Station.** A ground station normally operates from a stationary, fixed, or permanent location and utilizes antennas that are permanently mounted.

k. **Mobile Station.** A mobile station normally operates in motion or during halts at unspecified locations. Mobile stations include hand helds, ground vehicles, waterborne vehicles, and aircraft.

l. Search and Rescue (SAR) Station. SAR stations are fixed or mobile stations authorized to operate on specific aeronautical frequencies for search and rescue purposes.

m. Simplex Operation. Simplex is operating on the same transmit and receive frequency.

n. Duplex Operation. Duplex is operating on different transmit and receive frequencies. It is commonly used with repeaters.

o. Repeater. A repeater is an interconnected receiver and transmitter system, that automatically retransmits, on the output frequency, what is heard on the input frequency. Repeaters and/or their associated antennas are placed in higher locations to extend the range of fixed and mobile stations.

p. CAP Form 76, *Radio Operator Authorization*. A CAPF 76 is issued to CAP personnel who meet the requirements listed in para 5-1 of this regulation. Issuance of CAPF 76 is restricted to the wing DC (or his/her designee) or higher authority.

q. National Digital Radio Network (NDRN). The name National Digital Radio Network (NDRN) refers to the entire digital (packet & other digital modes) network from the top level, high speed transcontinental forwarding paths, to the end user in each CAP unit.

r. Digital Communications. Digital communications refers to a radio communications system that uses computers and associated equipment to transfer messages and files across the country.

1-9. Communications with Higher Headquarters. In general, problems and questions are best handled at the lowest echelons. Any problems or questions should be addressed to the next higher headquarters first. Only if no resolution is achieved should higher headquarters be contacted. Intermediate echelons must be kept informed on the resolutions of any problems or questions directed above their headquarters.

1-10. Supplements/Operational Instructions (OI). Units issuing supplements or OIs to this regulation must submit a copy to HQ CAP/DOK.

Chapter 2 COMMUNICATIONS PLANS

2-1. General. Communications plans for support of the CAP mission fall into three separate categories. Each category requires separate planning in order to effectively provide communications support for the type of mission being performed. The three categories are as follows: (a) Emergency Communications Plan, (b) Operations and Training Plan, and (c) Repeater Plan. These categories may be combined into one plan, at the option of the unit communications officer. CAP networks at all levels must be ready to provide at least the minimum services required to support each mission, regardless of how small or large it may be. Simplicity and flexibility are the two most important factors to be taken into consideration when preparing a communications plan. Each unit should tailor a plan based on the resources on hand, rather than a desired plan, which is not feasible due to inadequate resources.

2-2. Communications Plan Requirements. Each CAP region and wing will develop and publish an Emergency Communications Plan, an Operations and Training Plan, and Repeater Plan. Communications plans will be written in support of the next higher headquarters. Such plans will be reviewed annually and kept current by supplements and changes as conditions require. Each wing will submit one copy of the plans and changes to their respective region DCS/Comm and one copy to HQ CAP/DOK, not later than 10 January of each year. Each region will incorporate the wings' plans into the region plans and submit the plans/changes to HQ CAP/DOK no later than 10 April. Region plans will become the basis for the National Communications Plan.

Planning Considerations. All plans should include provisions for the employment of all resources. In the event of an actual emergency, an effective emergency communications plan will provide critical, initial means of communications with a minimum time delay. Communications requirements will vary with each emergency. The activation of a minimum number of key stations at the onset of an emergency will permit more effective communications and a rapid analysis of what communications requirements will be. The geographical size of the state, type of terrain, location of major population areas, location of CAP units, and communications resources are all primary factors which influence the development of a sound plan. Selecting the state of Tennessee as an example, there are five major population areas: Memphis, Martin, Nashville, Chattanooga, and Knoxville. By dividing the state into five areas, we have basic boundary requirements for a task force area operation. Two key CAP radio stations are selected for each area, one assigned as area NCS and the other as alternate NCS. Key stations must be carefully

selected. Ideally they should be stations operational and monitoring daily, with transmitting and receiving capabilities on all authorized CAP frequencies. Geographical location of key stations within an area is also important since emphasis should be placed on the use of the higher frequencies (26.62 MHz and VHF) for communications with units within a task force area. Sound frequency management and utilization to include the national emergency frequency must not be overlooked. With five stations of this category backed by an alternate station in each of the five task force areas, the foundation of a limited but dependable state-wide communications network is assured. Expansion of this network by the task force area net control stations can be done by employing other stations within their area as needed.

2-3. Emergency Communications Plan. Answers to the following questions will aid in providing the basic requirements for an emergency communications plan at all levels:

- a. Considering key locations within an area (state, county, city, etc.), what would be the minimum number of radio stations required for initial support of an emergency condition?
- b. Considering topographical conditions of the area, where would these stations be located?
- c. What stations are presently located at the key locations? Selecting two stations for each location, which has the best capability from the standpoint of availability and resources?
- d. Is there a requirement for radio relay stations? Are they available? Do they meet frequency and power requirements?
- e. Considering propagation changes and other frequency problems normally encountered during a 24-hour period, what are the best locations for net and alternate net control stations?
- f. Has an alternate been assigned for each key station?
- g. Are provisions made for utilization of ground and air mobile stations?
- h. Are key stations equipped with auxiliary power?
- i. Are the key stations located where supplemental communications facilities may be available through federal or state government agencies (civil defense, state highway patrol, etc.)?
- j. Keep in mind that the initial requirement is for dependable communications with a minimum number of stations at key locations. Answers to the above questions will provide the basis for an emergency communications plan at all unit levels.

k. Format. Format is important from the standpoint of presenting the plan in logical sequence for the purpose of being easily understood. Simplicity and flexibility are essential; however, this should not be accomplished by sacrificing the inclusion of facts and details essential to effectiveness and utilization of the overall plan.

2-4. Operations and Training Communications Plan.

Operations and training plans, unlike emergency plans, are designed to provide a network of communications which will encompass the entire area of unit (region, wing, group, squadron) responsibility. Such networks are primarily required for the support of normal day-to-day operational and training requirements. Maximum radio station participation should be encouraged. In some cases, it may be necessary to schedule more than one net period a day in order to permit effective net operations. This is especially true in wings with large numbers of stations. In all cases, operations and training communications networks must provide commanders at all levels with a command channel to his/her subordinate units and higher headquarters. See para 5-1 for training class requirements.

a. Preparation of Operations and Training Communications Plan. A simple, flexible plan effectively utilizing the maximum number of unit radio station resources on a daily basis for operations and training purposes.

b. Network Requirements. The number and types of nets organized for any unit is primarily dependent on three factors: type of unit organization, number of subordinate units, and number of radio stations assigned (land and mobile). The participation of mobile stations on a scheduled basis is strongly encouraged at all times. All ground stations should participate on a regular net schedule basis.

c. Types of Networks. Basically there are six types of unit radio networks to be considered:

- (1) National Net
- (2) Region Net
- (3) Wing Net
- (4) Group Net (optional)
- (5) Squadron Net
- (6) Emergency Net (for bona fide emergencies and emergency training)

d. Network Functions. To provide an operations and training capability to staff sections of its headquarters and to the headquarters of each subordinate unit.

e. Frequency Planning and Utilization. Since the number of frequencies available to CAP are limited and multiple assignments are necessary, strict adherence to proper utilization is essential.

f. Net Composition.

(1) Networks of region, wing, and group will be comprised of the following ground stations: net control station, alternate net control station, and all remaining licensed ground stations. Stations appointed as NCS and ANCS should have single sideband, 26.620 MHz and VHF facilities as appropriate to their network capability.

(2) Squadron networks will be tailored to conduct net operations to the extent possible, based on the number and types of radio stations licensed to the unit.

(3) Mobile stations are not normally assigned to specific net operations and schedules. However, when traffic and training requirements permit, blanket authority will be issued for net participation. In some instances, the number of mobiles desiring to participate may create overcrowded net conditions and reduce network efficiency. Alternate action to such conditions will be the establishment of a separate schedule for mobile stations.

(4) Optimum net efficiency can normally be achieved with as many as 10 stations participating during the same period. As this number increases, network efficiency declines. Units having more than 10 stations to participate in net operations should establish additional net schedules, as required.

2-5. Repeater Plan. Effective radio coverage makes clear, thought-out repeater plans a necessity. The growth of the repeater system should be pre-planned to support communications objectives.

2-6. Digital Communications Planning. The orderly development of digital communications, especially packet operations, requires a plan which states standards, delineates traffic routing maps (data grams), defines network architecture and provides for orderly network growth. An appendix should be developed for the Operations and Training Plan to guide digital communications use. Similarly, aspects related to emergency operations should be addressed as an appendix to the Emergency Communications Plan.

Chapter 3

CAP COMMUNICATIONS STANDARDS AND STATISTICS

3-1. General. The following establishes CAP communications standards, report and data requirements. The information provided by these statistics will be used in the *CAP Annual Report to Congress*, and to keep the region/wing commanders and other staff members informed about the CAP communications program. The below listed reports are required by HQ CAP/DOK.

3-2. Quarterly Station Statistics Report: (RCS: CAPDOK(A) H-1). Each region and wing will submit this report to HQ CAP/DOK not later than the 15th day of January, April, July, and September.

- a. Total number of authorized base stations.
- b. Total number of authorized ground mobile stations.
- c. Total number of authorized repeater stations.
- d. Total number of SAR stations.
- e. Total number of practice beacon stations.
- f. Total number of high-level digital nodes.
- g. Total number of packet end-user stations.
- h. Total number of radio operators.
- i. Narrative statement on activities and accomplishments of the past month (i.e., net participation, SAR/DR missions, exercises, etc.).

3-3. Annual Communications Effectiveness Exercises. The success and capability of providing adequate communications support to search and rescue missions is largely dependent upon the reliability and effectiveness of the communications network. In order to evaluate this capability, a Communications Effectiveness Test should be conducted annually. These tests will be conducted in accordance with the requirements for communications exercises contained in Chapter 5.

a. Each region will conduct a communications effectiveness test. This test will be unannounced with a three to twelve hour advance alert notice. Participants of each region effectiveness test will include all region and wing radio stations. A summary report and critique of the exercise will be submitted to HQ CAP/DOK within 30 days after completion of the exercise.

b. Each wing will conduct an annual communications effectiveness test (with prior region DCS/Comm approval). This test will be unannounced with a 3- to 12- hour advance alert notice. Each wing will submit a summary report and critique of the exercise to region headquarters/DC within 30 days after completion of the exercise.

Chapter 4

COMMUNICATIONS AWARDS, ACTIVITIES, AND PROGRAMS

4-1. General. The following awards have been established for the purpose of recognizing the service, achievements, and degree of proficiency attained by personnel who have applied their time and efforts to the CAP communications program. This includes cadets who meet the listed criteria (also specified in the *Senior Member Training Guide*, CAPP 214).

4-2. Awards and Citations. The awards available within the communications program are designed to serve a distinct purpose:

- a. Recognize those communicators who have given time and effort to promote the communications function.
- b. Encourage the undertaking of communications related activities at all levels.

4-3. The Communicator Badge. The Basic Communicator Badge is designed to recognize those individuals involved in communications. The requirements for this award are the same as those for the Senior Member Training Program, Technician Level in Communications (CAPP 214).

Approving Authority: Squadron/group communications officer.

Award Media: Basic Communicator Badge to be worn IAW CAPM 39-1, *Civil Air Patrol Uniform Manual*.

4-4. The Senior Communicator Badge. The Senior Communicator Badge is designed to recognize the continuing participation of active communicators. The requirements for this award are the same as those for the Senior Member Training Program, Senior Level in Communications (CAPP 214).

Approving Authority: Wing director of communications.

Award Media: Senior Communicator Badge to be worn IAW CAPM 39-1.

4-5. The Master Communicator Badge. The Master Communicator Badge is designed to recognize those communicators who have mastered the communications specialty and have progressed to management of the CAP Communications Program. The requirements for this award are the same as those for the Senior Member Training Program, Master Level in Communications (CAPP 214).

Approving Authority: Region director of communications.

Award Media: Master Communicator Badge to be worn IAW CAPM 39-1.

4-6. Application for Communicator Badge. The communicator badge (basic, senior, master) should be applied for on CAPF 2A, *Request for and Approval of Personnel Actions*. The communications officer will sign

as requester. At wing and region levels, the director of communications will initial the appropriate wing/region authorization lines and forward to the appropriate commander for signature. Documentation supporting the eligibility of the member will be listed in the remarks section. The CAPF 2A and all supporting documentation will be sent to the appropriate approving authority.

4-7. Cadet Eligibility for Communicator Badge. Cadets are encouraged to pursue each level of the communicator badges. To do so, cadets must meet all the training requirements listed in the appropriate section of CAPP 214 with the exception of the portions specifically intended for the senior member training program. Application is made in same manner as detailed in para 4-6 above.

4-8. Communicator of the Year. This award has been established to recognize a current member who has made a significant contribution to the CAP Communications Program as a whole. This selection should be based on the member's lifetime contributions to the CAP Communications Program, not just the year of nomination.

a. Each wing and region will conduct this program and award a "Communicator of the Year" at their level. The winner of this award is submitted as the nomination to the next higher echelon. Units below wing level may also make this award at their level, if they desire. This is encouraged where practical.

b. Nominations, in narrative form, are to be submitted through channels in accordance with the following timetable:

(1) 15 January - Unit nominations due to wing for consideration as the "Wing Communicator of the Year."

(2) 15 February - Wing nominations due at region for consideration as the "Region Communicator of the Year."

(3) 15 March - Region nominations due at HQ CAP/DOK for consideration as the "Civil Air Patrol Communicator of the Year."

In the event that no nomination is received HQ CAP/DOK will request a nomination from each of the region DCS/Comms for consideration.

c. HQ CAP/DOK will appoint a committee to choose the selectee at the national level. The selectee's name will be sent to the national commander by 1 May for final approval.

d. At each echelon, the Communicator of the Year Award should be presented at an appropriate function such as the wing or region conference. The national award will be presented annually at the August National Board Meeting.

4-9. Accreditation. In order to provide uniform requirements, the following criteria for mission communications must be met in order to receive accreditation per CAPP 214 (any deviation must be pre-approved by the region DCS/communications).

- a. Primary duty on missions must be communications related (communications officer, radio operator, message clerk, logger, technician, etc.)

- b. Any reimbursable mission qualifies.

- c. Non-reimbursable missions may be accredited by the approving authority. The application for such

accreditation should include the nature of the mission, scope, and scenario and must be endorsed by the commander.

- d. For consideration for the Master Communicator Badge, accredited missions must be wider in scope than the member's home group, preferably statewide.

4-10. Credit for Prior Accomplishments. Persons having previously completed any or all of the requirements for a particular level should note the date and circumstances on the application for the award. Persons who have already completed an item need not re-accomplish it, but will be given credit for properly documented accomplishments.

Chapter 5 RADIO OPERATOR TRAINING

5-1. Requirements for Operating a CAP Radio Station. CAP radio stations are authorized by the Federal Government through the National Telecommunications and Information Administration for emergency, training, and operational activities. Members are authorized to operate CAP radio stations upon certification by wing or higher authority. Application for certification may be made after attending a communications orientation class. At wing level and below, this class is conducted under the oversight of the wing director of communications who will designate qualified trainers within the wing. The orientation class is encouraged for all CAP members--seniors and cadets--and will be composed of the following topics as a minimum.

a. Part I. Standard Operating Procedures. Basic familiarization and demonstration of do's and don'ts including:

- (1) Calling and answering
- (2) Use of call signs
- (3) Operating the radio
- (4) Basic prowords
- (5) Prohibitions
- (6) National communications policies

b. Part II. Local Operating Procedures. Basic familiarization with the specifics applicable to the local area in which the communications user will operate including information such as:

- (1) Location and use of local repeaters
- (2) Local operating practices
- (3) Special local procedures
- (4) Local net schedules
- (5) Region, wing and local policies

c. In the future, a video product may replace Part I of the class. The entire orientation class should nominally take no more than 1 to 2 hours. There is no test. Trainees are certified upon the recommendation of the instructor to the wing director of communications.

5-2. Certification. Upon completion of the communications orientation class described in para 5-1, the class instructor forwards the recommendation for authorization up to wing or higher authority. Proof of this class must be retained in the individual's personnel records (CAPF 45, *Senior Member Master Record*, or CAPF 66, *Cadet Master Record*) and furnished to the appropriate wing/region officials upon request. When satisfied with the qualifications, the director of communications issues a *Radio Operator Authorization*, CAPF 76. See Figure 5-1. This authorization must be in the operator's possession when operating CAP radio equipment or when operating on CAP radio frequencies.

5-3. Advanced Communications User Training. Para 5-1 and 5-2 above detail the basic training required for

users of the CAP communications system. This training is minimal orientation only. However, more advanced training is required for some members. Specifically, those individuals who desire to own their own radio station for operations on CAP frequencies, who want to become more involved in CAP communications by pursuing the Communications Officer Specialty Training, or those members who assume staff positions requiring they be issued a corporate radio asset, require advance training. This training will be conducted under the oversight of the wing director of communications who will designate qualified trainers within the wing. No card or form is issued as proof of this training. It is simply recorded in the individual's personnel records (CAPF 45 or CAPF 66). Before registering a radio station to a member, the director of communications or licensing officer will validate that the member has met this training requirement.

a. Advanced Communications User Training will consist of these minimum topics:

- (1) Network operating procedures
- (2) Formal message preparation and handling
- (3) Familiarity with different radio modes and equipment, e.g., HF, VHF, SSB, FM
- (4) Working knowledge of CAPR 100-1, Volume I
- (5) Basic orientation to digital radio operations

b. Successful completion of CAPF 119, *Advanced Communications User Test*, which is an open-book test. A passing score of 80%, corrected to 100%, is required.

c. This training will nominally require no more than 4 hours. If more than 4 hours of training is deemed necessary, a separate and optional class for those individuals interested in further training should be considered. It should be remembered that these two levels (para 5-1, 5-2, and 5-3) of training are for the certification of communications users. Communications officers who manage the CAP communications system receive further training in accordance with CAPP 214. Similarly, communicators serving in the emergency services mission receive further training in accordance with CAPR 50-15, *CAP Operational Missions*.

5-4. Holders of Obsolete CAPF 76. The old CAPF 76, *Radio Operators Permit*, is obsolete and should be replaced as soon as possible. Holders of the old "ROP" card have received sufficient training and will be automatically issued the new card and credit for Advanced Communications User Training.

5-5. On-going Training. Communications training is an on-going requirement.

a. Communications Exercises. Communications managers should plan and execute communications exercises and training on a regular basis to give operators

the opportunity to remain proficient and to test unit communications capabilities. Each wing and region will conduct at least one communications exercise per year. In addition, National Headquarters will conduct one major nationwide communications exercise annually. Participation will be verified by the NCS Log. A summary of the exercise and the log of all participants will be forwarded to the next higher echelon within 30 days of the close of the exercise.


b. Communications Meetings/Conference. Periodic meetings of communicators and communications managers from region, wings and subordinate units is essential to the maintenance of an effective communications program. This provides a forum for discussion of communications problems, new proposals, an exchange of ideas, development of mutual understanding, an opportunity for individual and unit recognition, discussion of program changes, and a renewal of interest by the members. This helps build a team concept which is crucial to the communications program. Each region and wing should conduct a minimum of one annual conference of all communicators and communications officers. Similar conferences/meetings below wing level are highly

encouraged. A summary of the meeting, including a log of the participants, must be submitted to the next higher echelon within 30 days after the activity.

5-6. Operation of CAP Radio Equipment by Non-members.

a. The NTIA manual states that "the station should be operated by an employee . . . or by a person who operates under the control of the department or agency on a contractual or cooperative agreement and who is under the supervision of the department or agency sufficient to ensure that . . . agency instructions and limits are met." (NTIA para 8.2.17.1.c). In short, any non-member may operate a CAP radio, for CAP business, provided they are directly supervised by a qualified CAP member.

b. If the agency is another federal user, then there is no problem. (A statement is added to the SFAF that so-and-so agency may use the frequency as part of a mutual aid agreement.) If the agency is not part of the Federal Government, then the FCC must approve. Contact the wing/DC or region DCS/Comm for detailed instructions. (Source: NTIA 7.12, second paragraph).

| | | |
|---|---|--|
|  <p>National Headquarters Civil Air Patrol Maxwell AFB AL 36112-6332</p> | | <p>Under the authority of the National Telecommunications and Information Administration (NTIA) the person identified on this form is authorized to operate radio equipment in accordance with frequency assignments granted to the Civil Air Patrol by the Air Force Frequency Management Agency.</p> |
| <p>RADIO OPERATOR AUTHORIZATION</p> <p>Name and address of operator: John Doe 123 Main Street Montgomery AL 36112</p> | | |
| <p>Card # AL-00123</p> | <p>Expiration: 31 AUG 98</p> | <p>Signature of Issuing Officer</p> |
| | | <p>THIS AUTHORIZATION IS NOT TRANSFERABLE. It remains the property of HQ CAP and will be returned promptly upon proper written notice.</p> |

CAP Form 76, Aug 96

Previous edition is obsolete.

FIGURE 5-1. RADIO OPERATOR AUTHORIZATION CARD

Chapter 6 COMMUNICATIONS MANAGEMENT

6-1. Unit Radio Authorization Application. Units may use formats, such as Figure 6-1, for collecting information to use in a request for a radio station authorization. This information should be provided to the wing/DC or region DCS/Comm for any authorization request. The wing/DC or designee will either permit your station to join a “fleet license” or apply for a new authorization. (More detailed frequency information is in CAPR 100-1 Volume II and in other sources.) This information will be enough to maintain all the necessary records maintained by wing or region headquarters.

6-2. Posting of Station Authorization. Under NTIA and DoD frequency management rules, there is no requirement to post the station authorization at the operating console nor at the transmitter site. The rules only state that the document must be on file somewhere in the unit. This can include magnetic media, such as floppy disks or hard drives.

6-3. Revocation of Authorization. A wing or higher commander may, for reasonable cause, terminate the privileges of any CAP member in his command to participate in CAP radio activities.

6-4. Communications Monitoring Program. As part of the CAP self-policing program, a CAP communications monitor program is maintained.

a. Purpose. To establish an effective, reliable, self-policing CAP monitoring program, which will ensure the maintenance of high standards, effective techniques, and efficient utilization of all CAP communications operations. This will be accomplished by surveillance of all authorized CAP frequencies in order to detect infractions of correct operating procedures, transmissions of signals beyond permissible frequency tolerances, and faulty or improper emission.

b. Responsibility. This chapter applies to all CAP personnel.

(1) The operation and administration of region and wing monitoring stations are charged to the appropriate region and wing headquarters.

(2) Sanctions for discrepancies reported by region headquarters monitoring stations are the responsibility of the appropriate region commander. Commanders are also responsible for the operations of any station under their command.

(3) Sanctions for discrepancies reported by wing headquarters monitoring stations are the responsibility of the appropriate wing commander.

c. Definitions:

(1) **Monitoring Station.** A radio station charged with the responsibility of performing random frequency surveillance and reporting of technical and operational

violations on CAP frequencies. This could be at region or at wing level.

(2) **Technical Violations.** The improper operation of equipment, such as off frequency operation, improper modulation, and unauthorized emission.

(3) **Operational Violations.** Unauthorized communications, poor radiotelephone procedure of a grievous nature, or unauthorized subject matter.

(4) **Discrepancy Notice.** CAPF 33, *Civil Air Patrol Radio Discrepancy Notice*, will be used when such action is required.

d. Region and Wing Monitoring Stations. Each region and wing commander will establish a communications monitoring program as required, depending on the geographical characteristics of the area to be served.

e. Monitor Operations. Region and wing monitoring stations will perform frequency surveillance operations in accordance with this chapter and respective region/wing policy. Special emphasis should be placed on frequency surveillance of the national calling frequencies, 4582.0 KHz and 7635 KHz.

(1) Who may submit:

(a) Any member may submit a discrepancy notice on CAPF 33 for radio stations or operators which are in violation of regulations or directives.

(b) All appointed monitoring stations will submit discrepancy notices within a 24-hour period from the time the discrepancy was first noted.

(2) Routing - Discrepancy notices will be completed in four copies by the reporting station. An information copy will be sent to the appropriate monitoring station for all actions initiated by stations other than the monitoring station. Two copies will be submitted for action to the region or wing headquarters as appropriate, and one copy will be retained in the station file for a period of 6 months.

f. Action to be Taken:

(1) **By Region/Wing Headquarters.** The commander will be provided a copy of all discrepancy notices from region/wing monitor stations. Notices pertaining to region/wing stations will be reviewed for sanctions as appropriate under para 6-4.g. of this chapter. Notices concerning stations other than those assigned to the region/wing will be forwarded to the unit headquarters (region/wing) of the station concerned.

(2) **By Violator.** The violator will acknowledge the discrepancy notice and return it through their unit commander to the region/wing commander with an explanation and, if necessary, any corrective measures taken.

(3) **By Region/Wing Headquarters.** Discrepancy notices and violator responses will be reviewed by the appropriate region or wing commander. If the

explanation and/or corrective action is deemed adequate, the sanction imposed under para 6-4.g. of this chapter may be withdrawn. One copy of the completed notice will be retained in the radio station permanent file.

g. Sanctions:

(1) Willful Violations. Without excluding other appropriate definitions, violations of rules, regulations, or procedures will be considered willful when committed intentionally rather than unintentionally or accidentally. The appropriate commander will classify a violation of a rule, regulation, or procedure as willful if the evidence is sufficient to convince him/her that the above intent did exist. A CAP member who willfully violates rules, regulations, or procedures while operating a CAP radio station on CAP frequencies will be subject to disciplinary action as deemed appropriate by his/her commander.

(2) Non-willful Violations. In cases of violations not classified as willful by the commander, the following sanctions will be imposed for violations indicated:

(a) Sanction A. For the first violation, the person(s) charged as responsible for the violations(s) will acknowledge the violation notice indicating the cause of the violation, and the steps that have been taken to prevent repetition, within 7 days from receipt of discrepancy notice.

(b) Sanction B. For the second violation, Sanction A plus operator suspension for 15 days.

(c) Cumulative Violations. Upon receipt of a third violation during a 12-month period, the offending operator and/or station will be suspended until the appropriate region or wing commander authorizes reinstatement.

h. Monitor Station Equipment and Frequency Measuring Standards. Region and wing monitor station requirements will be established commensurate with the established monitoring program of the unit.

i. Records of Violations. Records of violations, with action taken, will be filed at region or wing headquarters as appropriate in such a manner as to reflect all violations charged against stations and/or operators.

6-5. Authorization Records and Inventory. An efficient filing system of all radio stations authorized is the responsibility of each region and wing director of communications. These records will reflect the station number, type, call signs, availability, and current status. To ensure accurate record keeping procedures and adequate control measures over authorized fleet stations, records of such authorizations (in the form of an original application from the stations) will be maintained and filed at region and wing headquarters levels. All files will be maintained in accordance with CAPR 10-2, *Maintenance and Records Disposition*.

6-6. Authorization of Practice Beacon for Locator Training Purposes:

a. Frequencies Available. Seven aeronautical utility ground control frequencies are available for assignment in locator training use provided harmonic radiation (at 243.20 MHz, etc.) is suppressed and on condition that there is no harmful interference to voice transmissions. These frequencies are 121.6 MHz, 121.65 MHz, 121.7 MHz, 121.75 MHz, 121.775 MHz., 121.8 MHz, 121.85 MHz, and 121.9 MHz. Any one of these frequencies may be applied for on the authorization application. If more than one training beacon is authorized, and more than one of these frequencies are authorized, indicate on authorization application the frequencies to be used.

b. Modulation Requirements. 6KOOA2N emission (waving tone). Practice beacon transmitters must not be used for voice transmission.

c. Type Acceptance. Practice beacon transmitters used for training must be FCC type accepted or conforms to the equipment parameters of J/F-12 Number 7192 for Pointer Cadet 6000 practice beacon (M121.775).

d. FAA Notification. Notification of intended use of practice beacon transmitters and the training frequency to be used must be made to the appropriate FAA Regional Frequency Management Office, the FAA Flight Service Station, and the local air traffic control facility nearest the practice beacon transmitter(s) operating location(s). Notification will include: date of test, test location, geographical coordinates, and a local contact (individual). The activation of a practice beacon transmitter must be coordinated with the nearest FAA Regional Spectrum Engineering Office by telephone. Telephone notification must be made to the FAA Regional Frequency Management Office during normal office hours, 0800 - 1600 local time, Monday through Friday. Practice beacon transmitters must be authorized before CAP personnel can conduct and manage tests or training. Otherwise, Air Force liaison office personnel must schedule, conduct, and manage them. No notification is required for 121.775 MHz.

6-7. Registration of VHF/FM Repeaters or Digipeaters. All VHF/FM Repeaters/Digipeaters and their associated mobiles must be registered with the Air Force Frequency Management Agency (AF/FMA) via a Standard Frequency Action Format (SFAF) through HQ CAP/DOK.

| Request for Station Authorization | | | |
|---|--------------------------------------|-------------------------------------|----------------------------|
| 1. Requester: | | | |
| Name: | | Grade: | Charter No: |
| Address: | | | |
| City: | | State: | Zip Code: |
| CAPF 76 No: | Expiration Date: | | Date of Advanced Training: |
| 2. FAA Coordination. | | | |
| a. Will the antenna be over 500 feet above the ground? Yes No (Circle one) | | | |
| b. If the antenna is within 3 NM of an airport (remember that an airport could have the border placed beyond actual fencing): | | | |
| Will the antenna be at or above 200 feet above the airport elevation? Yes No (Circle one) | | | |
| <i>Note: If you have answered YES to either 2a or 2b above, FAA coordination will be required.</i> | | | |
| 3. Landlord: (if your antenna is located on federal lands answer a & b below). | | | |
| a. Provide the agency/unit name: | | | |
| b. Provide the federal installation frequency manager's name. (If none exist, then provide the CAP unit that is responsible for the antenna. For example, if it is California Wing, then enter PACRCA.) | | | |
| 4. Location (ground station): | | | |
| a. City, town or point of land on which the antenna is located: | | | |
| b. Coordinates for the transmit antenna expressed in latitude and longitude: | | | |
| _____ North _____ West | | | |
| 5. Antenna: | | | |
| a. Generic name for antenna (collinear, whip, dipole, dipole array): | | | |
| b. Dbi gain of the antenna: | | | |
| c. Distance above sea level expressed in meters (feet times 0.3048): | | | |
| d. Distance above the ground to the antenna feedpoint expressed in meters: (Note: This is not the distance from the ground to the antenna tip.) | | | |
| 6. Operational Frequency Bands and Modes: (Check as appropriate.) | | | |
| <input type="checkbox"/> VHF FM | <input type="checkbox"/> VHF Digital | <input type="checkbox"/> HF Digital | |
| <input type="checkbox"/> VHF AM (Airband) | <input type="checkbox"/> HF SSB | | |
| 7. Operating Radius: | | | |
| a. What is the <i>service area</i> or operating radius expressed in kilometers (miles times 1,609)? | | | |
| <i>Note: This is not the greatest distance you can transmit, but the actual operating radius you will be using.</i> | | | |
| 8. Coordination: | | | |
| a. Names of whom you coordinated with: | | | |
| Date Requested: | Date Approved/Disapproved: | Signature of Approving Authority: | |

Figure 6-1. Sample Station Authorization Request Form.

Chapter 7

RADIO STATION OPERATION AND PROCEDURES

7-1. Safety. Each CAP radio station will establish and adhere to the following minimum safety standard operating procedures. The purpose of these procedures is to alert all personnel to the potential dangers of electronic equipment. All electronic devices carry certain hazards to which all operators and maintenance personnel are exposed. In spite of excellent training techniques and proficiency, complacency often leads to unsafe practices and procedures. Plastic frame eye glasses, instead of metal, should be used by personnel working on electronic equipment. All wrist watches, bracelets, and rings should be removed from the hands and arms.

a. Equipment Adjustments:

(1) Radio operators will make routine adjustments only. Adjustments which require the removal of panels or chassis from the equipment cabinet may be performed only by competent maintenance personnel as described in para 1-7.

(2) Maintenance personnel will not attempt to adjust any part of communications equipment when there is a possibility of receiving injuries from unprotected high-voltage components. Under no circumstances should equipment repairs be attempted on any electronic equipment with the power source connected.

b. Equipment Grounding. All communications equipment not in motion will be adequately grounded at all times. Conductors should be no smaller than a number 10 solid or stranded copper wire. Mobile equipment mounted to the body of the vehicle does not require an external ground, although grounding may improve station operation when practical.

c. Fuses. Replacement fuses should be of proper capacity per the equipment manufacturer. The use of tin foil, solder, or any other unauthorized material is forbidden. Such practice creates a potential fire hazard, may result in extensive damage to the equipment, and jeopardizes the safety of the operator.

d. Main Power Switches. All personnel having access to the radio station should be familiar with the location of the main power switch and properly instructed in the disconnect procedures.

e. Antenna. The primary power sources should be removed from all transmitters during periods of antenna maintenance. Lightning arrestors or grounding switches should be installed on all antennas. Special safety precautions should be taken when erecting antennas in the vicinity of electric power lines.

f. First Aid. Radio operators, maintenance personnel, and other personnel normally located in the vicinity of the radio station should be familiar with first aid procedures including treatment for electrical shock and administering artificial respiration and CPR.

g. First Aid Equipment. A first aid kit should be available. It should include items such as a flashlight, safety rope, direct breathing resuscitation kit, walking cane (non-conductive), and a blanket.

7-2. Emergency Electrical Power. Each net control station and alternate net control station should be equipped with an emergency power source to permit operation should commercial power fail, whether battery or generator powered. Emergency power operation, including battery backups, should be scheduled during one regular net period each month to ensure operational readiness when needed. All operators will be trained in the following:

a. Location of power unit and how to gain access.

b. If a generator, how to refuel, check oil, and start and stop the engine.

c. Ground safety rules concerning the operation of a gasoline engine, hazards involved in gasoline storage, carbon monoxide hazards, and the operation and location of a suitable fire extinguisher. Batteries require special safety procedures for venting and acid handling.

7-3. Station Logs. LMR frequencies do not use any logs. A master station log (such as the CAPF 110, *Air/Ground Point to Point Log*) are used at HF stations and at non-LMR stations. Both station and circuit comments are recorded. The logs are kept for 6 months. After 6 months, these may be destroyed. Note: Station logs and formal messages which include mission activity must be maintained for at least 1 year. The wing legal officer should be consulted prior to destruction of any mission related logs or messages. For stations that must maintain logs, the logs will show hours of operation, frequencies used, time and identification of formal messages sent and received, stations with which communications were held, and the signature of the operator on duty.

a. The log shall be kept in an orderly manner and in such detail that required data is readily available.

b. All time entries will be Coordinated Universal Time (ZULU).

c. No log or portion thereof shall be erased, obliterated, or willfully destroyed within the required retention period. Any necessary correction may be made only by the person originating the entry who shall indicate the erroneous portion, initial the correction made, and indicate the date of correction. Corrections must be made by line-through rather than obliteration.

7-4. Net Operations (Voice):

a. National Command Net. This net is composed of the stations representing region headquarters and National Headquarters. It is restricted to a primary and

two alternate stations for each region. The purpose of the net is to pass traffic from national headquarters to the region/wing nets for further dissemination.

b. Regional Nets. The regional net is composed of the stations representing the region headquarters and the wing headquarters within the region. The purpose of this net is to pass traffic from region or higher headquarters to the wings and from the wings to region or higher headquarters.

c. Wing Nets. The wing net is composed of the Wing Net Control Station and the stations representing the headquarters of the groups within the wing. When groups are not a part of the wing organization, the units of the wing will replace the groups. Wing nets will generally use high frequencies because of the distance to be covered. However, the use of VHF should be encouraged wherever feasible. The purpose of the wing net is to pass traffic from the wing or higher headquarters to subordinate units or from subordinate units to the wing or higher headquarters.

d. Group Nets. A group net is composed of the Group Net Control Station and the stations representing the headquarters of the squadrons within the group. VHF should be used when possible. The purpose of the group net is to pass traffic from the group or higher headquarters to the subordinate units or from the subordinate units to the group or higher headquarters.

e. Squadron Nets. The squadron net is composed of the Squadron Net Control Station and the stations representing the squadron's operational elements. Mobile stations at squadron level should be equipped with the capability to assure communications with other mobile stations and the squadron headquarters.

f. Special Purpose Nets.

(1) Communicator's Net. The daytime and nighttime communicator's nets are open to any communicator. The purpose of these nets is the free exchange of information. Questions of both a technical and administrative nature may be handled. Furthermore, the traffic originating on other nets may be handled on the communicator's nets to ensure widest dissemination.

(2) Chaplain's Net. Though the primary purpose of the chaplain's net is the exchange of information between chaplains at all levels, the net is open to all members for participation.

(3) Special Purpose Nets. There are several other special purpose nets such as disaster relief nets which are activated as necessary.

g. Nets, similar in operation to a squadron net, may be established temporarily for special activities such as search and rescue missions (either actual or for training purposes), summer encampments, etc.

h. When an actual or simulated emergency arises or is anticipated, it is sometimes necessary to reduce the volume of traffic ordinarily transmitted over communications systems. This action is required to facilitate prompt transmissions of vital traffic.

7-5. Civil Air Patrol Digital Communications Nets.

In addition to the voice nets, CAP operates a nationwide digital network in support of all operations. The National Digital Radio Network (NDRN) is an integrated system of HF and VHF systems that handle the bulk of all CAP formal message traffic.

7-6. Net Control Stations. Net Control Stations (NCS) and Alternate Net Control Stations (ANCS) control and direct the flow of radio traffic within their nets. Thus, a wing net control station directs the activities of the group and squadron stations in its net.

a. The authority of the NCS is confined to the operational control and supervision necessary to promote net discipline. The decisions and instructions of the NCS in conducting the net are final and will not be contested on the air. However, should a NCS abuse or neglect its responsibilities or go beyond the limits of its authority, a report will be forwarded, through channels, to the authority which appointed the NCS. If the instructions of the NCS are repeatedly or flagrantly violated by a subordinate station, the NCS will submit a report, through channels, to the commander exercising jurisdiction over the violating station.

b. The NCS is charged with the responsibility for the efficient movement of traffic within the net or network, for the relay of internet traffic, and for implementing the necessary measures to promote and ensure circuit discipline. In promoting circuit discipline, the NCS is authorized to initiate service messages to subordinate stations to correct communications discrepancies. All responsibilities of the monitor stations (para 7-6.b.) are also inherent to the NCS. The monitor stations will assist the NCS in detecting violations.

c. When the appointed NCS and ANCS temporarily leave the air, a competent provisional NCS will be appointed. The duties, responsibilities, and authority vested in the NCS will also apply to the provisional NCS. The provisional NCS must be a fully operational CAP station.

7-7. Digital Communications Operations. The operation of stations equipped with digital capability is covered in the *Packet Handbook*.

7-8. Net Schedules. All regions and wings are authorized to conduct net operations. The recommended minimum net schedules are: four per month for all regions and four per month for all wings.

7-9. Effective Utilization of Communications Equipment. All radio stations should participate in net operations. To obtain maximum use of CAP-owned radio equipment, directors of communications will take necessary action to redistribute equipment which is not being used effectively.

7-10. Traffic Categories. CAP radio traffic falls into three categories: formal, informal, and administrative.

a. Formal Traffic. Official traffic transmitted for, by, or in the name of the commander. These involve policy matters, information of record value, instructions, or orders.

b. Informal Traffic. During actual missions or training periods, traffic other than formal or administrative types may be required. For example: instructions to air and ground mobile stations, rapid exchange of target information, preliminary status reports, etc. Such traffic does not lend itself to the preparation of formal messages and in most cases will be a direct exchange of information between various participants in the mission.

c. Administrative Traffic. The transmission of direct questions and answers between staff officers, relating to the official business of the unit to which the participating officers are assigned. Although this traffic may be informal, the inclusion of traffic that is personal in nature is prohibited.

7-11. Security of Transmitters. Transmitters should be installed and protected so that they are not accessible to unauthorized persons. Locks or other devices should be used to prevent operation of transmitters by unauthorized persons when the station is unattended. Access to rooms, buildings, or vehicles containing radio stations should be limited to authorized personnel.

7-12. Transmitter Testing. Adequate precaution will be taken to ensure that signals are not radiated when transmitter testing is in progress. A dummy antenna will be used whenever possible.

7-13. Out-of-wing Operation. Operators of mobile stations sometimes have occasion to travel outside of the wing in which they are licensed to operate. When operating in another wing, operators must be constantly aware of possible mission activity and must contact the appropriate net control station for permission to operate. Operation in another wing is solely for the conduct of official CAP business. Before using any radio in the states bordering Canada, you must check with the wing DC to learn what the operating restrictions are. [Currently, the United States and Mexico do not have a treaty concerning communications in the border zone.] Operation on CAP frequencies in Canada and Mexico is prohibited.

7-14. Inter-wing Traffic. Communications between wings of the same region is encouraged. Except for emergencies, scheduled net periods will not be interrupted unless prior coordination and approval is obtained from the wing director of communications. Communications between wings is permissible for official business only. Organized tests and exercises

between wings of different regions are permissible during free net time providing concurrence is obtained from region and wing directors of communications. Inter-wing tests, training, and exercises are encouraged, but in all instances will be controlled by competent CAP personnel who will ensure that traffic transmitted meets the spirit and intent of this manual as official CAP business.

7-15. Voice Call Signs.

a. Within CAP, each region and wing is assigned a unit tactical call sign. The tactical call sign plus a serially assigned number comprise the complete CAP tactical call sign. Serially assigned numbers will not exceed four digits.

b. Tactical call signs one through five in each region/wing will change with changes in staffing. Assignments of tactical unit call signs one through five for region/wing are as follows:

- (1) Region/wing commander
- (2) Region/wing vice commander
- (3) Region/wing chief of staff
- (4) Region/wing director of communications
- (5) Region/wing chaplain

c. During actual/practice search and rescue missions and special events, temporary functional call signs may be assigned. The wing DC, the mission commander, or the special events commander have the authority to use this option:

(1) Line of sight LMR nets may use functional call signs without a location prefix. Examples are "Air Ops," "Flight Line," "Comm," "Command 1," "Command 2," "Flight 1," "Flight 2," "Admin," "Pipeline," "Transport," "Survey," etc. (The use of digits with a call sign is optional.)

(2) HF systems must use a geographical name for the station or location. An example is "*Montgomery* CAP Mission Base."

(3) Aircraft control facilities are identified by using the base, location, and service required (for example, "CAP Control," "CAP Mission Base," "New York RADIO" (as in aeronautical station), etc. CAP ground stations communicating with an aircraft could use "MONTGOMERY MISSION BASE."

d. Aircraft Call Signs. CAP corporate aircraft will use "CAPflight" (pronounced "Capflight") at all times. Member-owned aircraft may also use the CAPflight call sign when on reimbursable missions. Wings and regions will use their charter number as the first two digits of the call sign and will devise a suitable plan for assigning the second two digits. Controls must be present in this plan to prevent two aircraft from using the same call sign simultaneously. Wings with a zero as the first number of their charter will drop the leading zero, therefore, their CAPflight call signs will be three digit calls. No other truncating of the call sign numbering is authorized, meaning both of the second two digits must be used.

(1) **Flight Plans.** The three letter identifier “CPF” is used within the FAA computer system in place of the spoken word “CAPflight.” For this reason, “CPF_____” will be used in place of the aircraft tail number on flight plans. In the remarks section, the voice identifier “CAPflight _____” must be included as well as the tail number of the aircraft.

(2) **Exceptions.** Wing or region commanders may approve the aircraft tail number as a call sign when a “customer” has specifically requested it. This could apply to some missions conducted for Customs or DEA.

7-16. Digital Call Signs. Because the National Digital Radio Network, from top to bottom, is an operational network, a highly structured call sign system is required. CAP digital call signs use the structure @##### for wing level and @@@### for region level and above (where @ represents letters and # represents numbers). Call signs with fewer than the required digits will use leading zeros. (Example: Headcap 1 uses NHQ001).

a. Wing Call Signs. Wing digital call signs will be made up of the two letter postal followed by the assigned four digit number. For example, Pikes Peak 13 would become CO0013.

b. Region Call Signs. Region digital call signs will be made up of the three letter region abbreviation followed by the assigned three digit number. For example, North Central 4 would become NCR004. Note: the Pacific Region would be abbreviated PAC.

c. Issuance.

(1) Personal call signs may be issued to qualified members who have been trained in digital operations. Members need not have a radio or radio access to the digital system to be issued a call sign. The design of the digital radio system allows for telephone ports.

(2) BBS call signs will be issued as station licenses as opposed to personal call signs of members, in order to reduce configuration changes when, from time to time, SYSOP assignments change from member to member. Wing/region call sign plans for BBSs should be systematic. (For example: wings may use the plan @@1000, @@2000, @@3000 to identify BBSs.) It is understood that SYSOPS originating messages on their BBSs may send the message using the BBS station call sign (Example: NHQ100@NHQ100) without being considered to be in violation of call sign regulations.

(3) **SSIDs.** National Headquarters shall, from time to time, issue a list of standardized Secondary Station IDs (SSID) for different categories of stations, including digipeaters and nodes.

d. Limitations. End users shall only use one mailbox or BBS for access to the digital network.

7-17. Frequency Interference. Increasing demands for radio channels have resulted in a continuing space reduction between channels and in a sharing of

frequencies on the basis of time or geographic separation. Some interference must be expected as frequencies used by CAP are shared with other agencies. Certain voice, CW, and teletype signals audible on CAP channels are not illegal interference, as these signals may be from other authorized agencies.

7-18. Interference Reporting Procedures. The focus should be to resolve interference at the lowest level. A unit affected by interference must begin an investigation to identify the source. Once you identify the interference source, report it. When you can not identify the source, you should include the sources you checked and the results of the investigation in your report.

a. Report Submission:

(1) Check with equipment maintenance personnel to determine if the interference is the result of maintenance actions or an equipment malfunction.

(2) Check with other stations in the geographical area to determine the area affected. Knowing if other nearby stations are experiencing the same type of interference may aid in determining the source.

(3) When you suspect co-channel interference (interference between systems that have been assigned similar frequency allocations), check with wing/region communications officers to determine the location of frequency assignments that fall within the bandwidth of the victim receiver.

(4) Determine the bandwidth, relative amplitude, and modulation of the interfering signal with a spectrum analyzer, if available. Find the approximate bandwidth by varying the receiver frequency to determine the affected frequency band.

b. Exceptions to Reporting. Do not report an incident when the interference is transient noise from natural sources (for example, rain, solar activity, lightning, and so forth).

c. Types of Reports:

(1) **Initial Report.** File a report as soon as possible after the beginning of the interference. Include all available data and send it up through wing/region to HQ CAP/DOK. You may ask for frequency management assistance in the initial report.

(2) **Supplemental or Follow-on Reports.** Submit supplemental reports when you need to add to or modify information previously submitted. Include the date/time group of the initial report and any previous supplemental reports and send them via the same route that you sent the initial report.

(3) **Closing Reports.** Issue a closing report when the interference incident is resolved or requires no further action.

Chapter 8 VHF OPERATION

8-1. General. The CAP communications program makes a major use of VHF (very high frequencies), because VHF normally provides excellent, dependable, short-range communications. VHF is readily adaptable to ground and air mobile operations. Due to the line-of-sight characteristics of VHF, a major advantage over HF (high frequency) is gained since the frequency can be effectively used by a greater number of stations without mutual interference problems.

a. Simplex operation on 143.750 MHz. and 143.900 MHz. is authorized (at wing level and coordinated with HQ CAP/DOK) where such operations will not interfere with repeater operations. While simplex operations may be conducted, on a secondary basis to repeater operations, no protection will be provided to simplex users. It is recommended that CTCSS tones are not used in this simplex mode.

b. The national standard frequency and tone encode assignment is mandated in corporate radios as follows:

- Channel. 1 : 148.1500 MHz. simplex 100 Hz.
- Channel. 2 : 148.1250 MHz. simplex 100 Hz.
- Channel. 3 : 148.1375 MHz. simplex 100 Hz.
- Channel. 4 : 149.5375 MHz. simplex 100 Hz.

This is also recommended for all non-corporate radios to assist in ease of operation.

8-2. Frequency Modulated (FM) Repeater Stations:

a. General. FM repeater stations may be authorized for use in the CAP Communications Program. Use of repeaters, while normally advantageous, can also be a disadvantage by creating unacceptable interference and compatibility problems.

b. Special Use Repeaters.

(1) A *transportable repeater* is defined as a repeater system authorized for temporary use at unspecified fixed locations. Use of such systems will be limited to emergencies, scheduled tests, and events of a wing or higher command. Approval of the wing director of communications is required before each use, except emergency use during authorized missions. If interference to an adjacent wing or region might be experienced in a non-emergency situation, the request must be referred to the Region Repeater Committee(s) for their approval/disapproval. All technical standards, as described in this chapter, will be met by any equipment authorized for a transportable repeater system. The CTCSS tone of 203.5 Hz has been reserved as the input tone for transportable repeaters. This tone will not be used as an encode or decode tone on any permanently installed ground-based repeater station.

(2) An *air-mobile repeater* is defined as a repeater system authorized for temporary use while in flight. Use of air-mobile repeaters will be in accordance with para

8-2.b. above. In addition, a control operator will be present in the aircraft to monitor the repeater's operation.

c. Tone Signaling: All tone signaling, interconnection of devices, or control equipment intended for general membership use, will be accomplished using the standard Dual Tone Multi-Frequency (DTMF) tones found on 12-button keypads. Additional DTMF tones found on the 16-button keypad may be used for supervisory control.

d. Repeater Access:

(1) All installations of VHF-FM voice repeaters will require Continuous Tone Coded Squelch System (CTCSS) tone access. Each voice repeater will have, at a minimum, a primary discrete tone, selected from the Electronic Industries Association (EIA) standard CTCSS tone frequencies list (see Table 8-1).

(2) Each voice repeater will have a primary discrete tone that is not in use by any other CAP voice repeater operating on the same RF frequency within 200 statute miles (exceptions are at the discretion of the Region Repeater Committee). 100.0 Hz will not be used as a primary discrete tone. No repeater will transmit or retransmit a 100 Hz tone.

(3) The universal access tone of 100.0 Hz will be installed in each voice repeater unless unique circumstances will prevent it. If the 100.0 Hz tone is not installed in a specific voice repeater, a written exception must be requested from National Headquarters through the region headquarters.

(a) It is the duty of each station operator to utilize the correct primary discrete tone for the intended voice repeater. A visiting mobile may use 100.0 Hz, for a short duration, to contact a local station to determine the proper tone to use. Whenever possible the individual member will obtain the proper tones to use, *before* going into another region or wing.

(b) Portable radios of 6 watts or less may use 100.0 Hz for routine operations only if the radio is incapable of using the primary discrete tone. Use of the primary discrete tone is required whenever possible to prevent interference. *NOTE: Portable radios using external antennas and/or power amplifiers must always use the primary discrete tone for the intended voice repeater.*

(c) Fixed stations, while operating through a voice repeater, are prohibited from using 100.0 Hz.

(d) It shall be clearly understood that 100.0 Hz use by any radio has the potential to access multiple voice repeaters and cause considerable unnecessary interference. For this reason, any use of 100 Hz on voice repeater frequencies is *STRONGLY* discouraged.

e. Deviation: Transmitters used in the FM Voice Mode (16K00F3E) will not exceed 4 KHz total deviation. (Repeater deviation should be set for no more than 4

KHz. so as to limit interference to the adjacent splinter frequencies.) CTCSS tones should be set for 750 Hz deviation.

f. Repeater Control:

(1) When any station within reliable range of a repeater is keyed (mike button depressed), provided it is on the proper RF frequency and encoding the proper CTCSS tone, the repeater transmitter is automatically turned on. A drop-out delay of not less than 1 second or more than 10 seconds is required after the end of each transmission.

(2) A time-out timer is required on all repeaters. This device will turn off the repeater's transmitter if there has been a period of not less than 2 minutes nor more than 5 minutes with no break in the reception of an incoming signal. This will prevent jamming due to equipment malfunctions, stuck microphones, etc. This also will protect the repeater from possible damage.

8-3. FM Digital Communications. VHF frequencies are considered to be the primary operational frequencies for digital operations. In order to avoid interference, CAP digital communications will generally be conducted on frequencies that are discrete from voice operations.

a. Frequency. 149.895 MHz is the nationally standardized frequency for digital communications. On a case by case basis, such as within 75 miles of the Canadian border, HQ CAP/DOK may direct that digital communications be conducted on other frequencies.

b. Special Conditions. During mission and other short term operations, other VHF frequencies may be used for digital communications, provided that they are authorized for digital communications, and are deemed appropriate by the mission, wing, or region director of communications.

c. Deviation. Transmitters used in the digital mode (10K00F2D) for Packet will not exceed 3.2 KHz total deviation. Digital modulation must be linear, without clipping, compression, or overshoot.

d. Identification. Digital transmissions, after initial setup, automatically identify the station on each transmission.

8-4. Aircraft Operations. Aircraft operating on CAP VHF-FM will normally use the air-to-ground simplex frequency (149.5375 MHz) for communications with ground stations. If 149.5375 MHz is not usable in a particular area, the second and third choices are *the repeater output not in use in the area*, then *the repeater output in use in the area*. Due to the potential for interference, use of a repeater from an aircraft will only be done when communications on the simplex frequencies are not viable. Airborne use of 100.0 Hz on repeater input frequencies is prohibited. Airborne VHF/FM transmissions are limited to a **MAXIMUM** of 10 watts.

CONTINUOUS TONE-CODED SQUELCH SYSTEM (CTCSS)

| Tone Frequency | Tone Code | | Tone Frequency | Tone Code |
|----------------|-----------|--|----------------|-----------|
| 67.0 | XZ | | 69.3 | WZ |
| 71.9 | XA | | 74.4 | WA |
| 77.0 | XB | | 79.7 | WB |
| 82.5 | YZ | | 85.4 | YA |
| 88.5 | YB | | 91.5 | ZZ |
| 94.8 | ZA | | 97.4 | ZB |
| 100.0 | 1Z | | 103.5 | 1A |
| 107.2 | 1B | | 110.9 | 2Z |
| 114.8 | 2A | | 118.8 | 2B |
| 123.0 | 3Z | | 127.3 | 3A |
| 131.8 | 3B | | 136.5 | 4Z |
| 141.3 | 4A | | 146.2 | 4B |
| 151.4 | 5Z | | 156.7 | 5A |
| 162.2 | 5B | | 167.9 | 6Z |
| 173.8 | 6A | | 179.9 | 6B |
| 186.2 | 7Z | | 192.8 | 7A |
| 203.5 | M1 | | 206.5 | 8Z |
| 210.7 | M2 | | 218.1 | M3 |
| 225.7 | M4 | | 229.1 | 9Z |
| 233.6 | M5 | | 241.8 | M6 |
| 250.3 | M7 | | | |

TABLE 8-1. LISTING OF STANDARD TONES

Chapter 9

FREQUENCY UTILIZATION AND NET SCHEDULES

9-1. CAP Frequency Policy. The radio frequency assignments authorized for CAP use are limited in number and vital to the support of the CAP mission. The extensive use of these frequencies requires strict control at all levels of command. For operational purposes, all references to CAP single-sideband frequencies should be to the carrier or dial frequency.

9-2. Frequency Utilization. Maximum frequency use will be made of all free frequency time on a first-come, non-interference basis. Alternate frequency assignments will be used only on a non-interference basis when propagation or interference precludes use of the assigned primary frequency. Net schedules are not permitted for alternate frequency assignments without coordination with HQ CAP/DOK.

9-3. Four Megahertz Frequency Assignments. Each CAP region is assigned a primary and an alternate frequency normally used in support of all communications requirements with the region. Primary and alternate frequency assignments are based on a checkerboard plan under which the least possible inter-region interference is experienced.

9-4. National Calling Frequencies. The carrier frequencies of 4582.0 and 7635.0 KHz are designated as the national calling frequencies and will be used in accordance with the following guidelines:

- a. These frequencies are authorized for use by all CAP stations for communications concerning all matters relating to official CAP business.
- b. Emergency operations will take precedence.
- c. No scheduled nets will be conducted on these frequencies unless coordinated by HQ CAP/DOK.
- d. Middle East and Pacific Regions are assigned 4582.0 KHz as their region alternate frequency and have precedence over other stations on that frequency except emergency or mission communications.

9-5. Frequency Priority. Emergency communications have priority over all other traffic on CAP frequencies. During periods other than emergency, primary frequency users will have priority over alternate frequency users.

9-6. Alternate Frequency Utilization. During region or wing communications exercises or tests approved by appropriate commanders, alternate frequencies may be used to supplement communications networks. However, verbal or written coordination and approval with the primary frequency user must be accomplished prior to the effective date.

9-7. Temporary Authorization for Net Changes. In the event that an assigned frequency is not usable for

scheduled nets, frequency changes may be requested. Wings should coordinate with the region DCS/Comm for a regional solution. If a new frequency must be requested, the region DCS/Comm will coordinate the assignment with HQ CAP/DOK. The region should use Table 9-1 to find the appropriate frequency or band for coordination. Except as needed for emergency or mission communications, frequencies not assigned to regions may be coordinated through HQ CAP/DOK on a first-come basis. The duration of the any *new* frequency authorization under this paragraph will be set by HQ CAP/DOK as agreed upon by the wings and regions involved.

9-8. Radio Net Schedules:

a. Net schedules for operation on all authorized CAP frequencies will be coordinated and established at region level. Requests for schedule changes, additions, and/or deletions on CAP frequencies will be coordinated through appropriate region DCS/Comm. If the change will be outside times already allocated to the region, coordination with HQ CAP/DOK is required.

b. All net schedules will be prepared in ZULU time. Since the days of the week in the schedules are also according to ZULU time, conversion of the tables to local time will, in some cases, mean that a net will be held a day earlier on local time. For example, a net scheduled for 0100Z Sunday would actually be conducted on Saturday local time.

c. Net times listed for all schedules will be changed to 1 hour earlier during periods when daylight-saving time is in effect unless otherwise established by region policy. For example, during daylight-saving time, a net schedule listed for 1300Z will be moved back 1 hour and held at 1200Z.

9-9. Frequency List. Frequencies permanently authorized for the CAP are listed in Table 9-1. This list is provided for information and planning purposes only. It does not constitute authority to operate. That authority is granted through normal wing/region channels IAW the appropriate sections of this regulation.

9-10. Net Participation by Aircraft. Air-to-ground and ground-to-air communications are essential for the support of emergency services missions. Regularly scheduled net operation of CAP air mobile stations is neither feasible nor practical; however, fullest utilization of this capability should be considered in all phases of communications training exercises and scheduled effectiveness tests.

| CAP RADIO FREQUENCY ASSIGNMENTS | | | | | | | | | | |
|---------------------------------|---|-------|-----|-----|-----|-----|-----|-----|-----|-----|
| Frequency and Emission | | | NER | MER | GLR | SER | NCR | SWR | RMR | PAC |
| notes | | | | | | | | | | |
| K2371 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | * | * | * | * | * | * | * | * |
| K2374 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | * | * | * | * | * | * | * | * |
| K4466 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | P | | | S | | | | |
| K4469 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | S | | | P | | | | |
| K4506 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | | | | | P | | | |
| K4509 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | | | | | S | | | |
| K4582 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | * | S | * | * | * | * | * | S |
| K4585 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | | P | | | | | | P |
| K4601 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | | | S | | | | P | |
| K4604 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | | | P | | | | S | |
| K4627 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | | | | | | P | | |
| K4630 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | | | | | | S | | |
| K7341 | Packet (200H00F1B) | 2,5 | * | * | * | * | * | * | * | * |
| K7635 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | * | * | * | * | * | * | * | * |
| K7920 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | * | * | * | * | * | * | * | * |
| K14902 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | * | * | * | * | * | * | * | * |
| K18205 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | | | | | | | | * |
| K20873 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | * | * | * | * | * | * | * | * |
| K26617 | Voice USB (3K00J3E), Packet (200H00F1B) | 1,2,5 | * | * | * | * | * | * | * | * |
| K26620 | Voice AM (3K00A3E), Packet (200H00F1B) | 5 | * | * | * | * | * | * | * | * |
| M121.6 | Practice Beacon (6K00A3N) | 5 | * | * | * | * | * | * | * | * |
| M121.775 | Practice Beacon (6K00A3N) | 5 | * | * | * | * | * | * | * | * |
| M122.9 | AM Voice (6K00A3E) | 5 | * | * | * | * | * | * | * | * |
| M123.1 | AM Voice (6K00A3E) | 5 | * | * | * | * | * | * | * | * |
| M143.75 | FM Voice (16K00F3E, 11K00F3E) | 5 | * | * | * | * | * | * | * | * |
| M143.9 | FM Voice (16K00F3E, 11K00F3E) | 5 | * | * | * | * | * | * | * | * |
| M148.125 | FM Voice (16K00F3E, 11K00F3E) | 5 | * | * | * | * | * | * | * | * |
| M148.1375 | FM Voice (16K00F3E, 11K00F3E) | 5 | * | * | * | * | * | * | * | * |
| M148.15 | FM Voice (16K00F3E, 11K00F3E) | 5 | * | * | * | * | * | * | * | * |
| M149.5375 | FM Voice (16K00F3E, 11K00F3E) | 5 | * | * | * | * | * | * | * | * |
| M149.895 | Packet (10K00F2D) | 3,5 | * | * | * | * | * | * | * | * |
| M149.925 | Packet (10K00F2D) | 4,5 | * | | * | | * | | * | * |

NOTES:

1. All SSB emissions will be upper side band (USB).
2. HF frequencies are window (or carrier); the center of the intelligence is 1.5 KHz above the listed frequency.
3. M149.895 authorized nationwide with the exception of certain areas near the Canadian border.
4. M149.925 authorized only in those areas adjacent to the Canadian border where M149.895 is not allowed.
5. This table reflects the frequency authorizations of the CAP. It is provided for information purposes only and does not constitute authority to operate.

TABLE 9-1. FREQUENCY LIST

Chapter 10

CAP FREQUENCY SPECIFICATIONS

10-1. Frequencies. The following frequencies may be used for CAP VHF-FM:

a. Voice Operations:

- (1) 143.900 MHz Repeater Input / 148.150 MHz Repeater Output and Simplex
- (2) 143.750 MHz Repeater Input / 148.125 MHz Repeater Output and Simplex
- (3) 148.1375 MHz Ground Tactical Simplex
- (4) 149.5375 MHz Air-to-Ground and Air-to-Air Simplex

Note: These frequency pairings are standardized nationally and will not be altered without the prior coordination through the appropriate region and approval through the region to HQ CAP/DOK.

b. Digital Operations. 149.895 MHz and 149.925 MHz (*where authorized along the Canadian Border*) are to be used exclusively for digital operations. No voice communications are permitted. Airborne use is prohibited on 149.925 MHz.

c. Emission. The following types of emissions are used for CAP radio communications. Authorized emissions are:

- (1) 3K00J3E, single-sideband suppressed carrier (SSB). Upper Sideband (USB) only.
- (2) 6K00A3E, Amplitude Modulation (AM) (26.620 only).
- (3) 16K00F3E, narrow band frequency modulation (FM).
- (4) 200HF1B, HF Packet Radio .
- (5) 10K00F2D, VHF Packet Radio.

10-2. Standards for Radio Stations. To reduce interference in the overcrowded frequency spectrum and to comply with the international agreements/NTIA regulations, CAP communications personnel will make certain that radio stations are on the proper frequency and the emissions meet the prescribed standards. The following checks and precautions will be observed:

- a.** Proper transmitter tuning and adjustments will be made to eliminate spurious radiation and harmonics.
- b.** Modulation will be maintained at a proper level to avoid excessive audible sideband emissions.
- c.** Tests will be conducted to determine that power output and frequency tolerance does not exceed limitations as outlined in Figure 1-7.
- d.** The use of 12.5 KHz spaced channels with reduced bandwidths will require the use of a highly selective receiver to minimize interference. A receiver with broad tuning characteristics will pass adjacent channel interference causing difficulty in receiving the desired channel.

10-3. Frequency Stability. All CAP radio transmitters will have their frequency derived by crystal reference.

The current frequency tolerances for CAP radio stations are in Table 10-1.

10-4. Frequency Measurement. The assigned carrier frequency of all CAP stations shall be measured by qualified maintenance personnel in accordance with para 1-7 of this regulation.

a. Frequency measurements will be required as follows:

- (1) When the transmitter is initially installed.
- (2) At any time the frequency determining elements are changed.
- (3) At any time the station operator has reason to believe the frequency has shifted beyond the tolerance specified.
- (4) After a station has been cited for a frequency violation (either by competent authority or by any CAP station deemed capable of performing accurate frequency measurements).
- (5) In accordance with wing/region policy.

b. Each frequency measurement should be recorded in the station log. This log entry will be signed by the person making the measurement and will show the deviation above or below the assigned frequency in hertz or percentage of deviation plus or minus the assigned frequency. If a station log is not required, the written statement, listed above, must be kept in the station file.

c. Radio transmitters shall be silenced immediately upon determining that transmitter frequency exceeds the authorized tolerance. Notations of actions taken to re-establish transmitter within authorized tolerance will be entered in the station log or kept in the station file.

10-5. Transmitter Power. For CAP stations using amplitude modulation (AM) or frequency modulation (FM) emission, the transmitter power authorized will be the mean envelope power. For CAP stations using SSB, the power authorized will be in terms of peak envelope power (PEP). The power of CAP transmitters shall be no more than the minimum required for satisfactory operation. In any case, output power will be limited to the following:

a. VHF stations:

- (1) 143.900 MHz, 50 Watts
- (2) 143.750 MHz, 50 Watts
- (3) 148.150 MHz, 50 Watts
- (4) 148.125 MHz, 50 Watts
- (5) 148.1375 MHz, 50 Watts
- (6) 149.5375 MHz, 50 Watts
- (7) 149.895 MHz (and 149.925 MHz where authorized) 50 Watts

Note: Aircraft stations limited to 10 Watts on VHF FM. While communication is important, flight safety is a

higher priority. Operations above 10 watts are prohibited.

b. HF stations (national, region, and wing) are limited to the minimum power required to establish communications.

c. Power output on 26.620 and 26.617 MHz is limited to 150 Watts PEP SSB (250 Watts in Hawaii).

Additionally, power output on 26.620 MHz is limited to 50 Watts AM.

d. Tone Signaling: All tone signaling, interconnection of devices, or control equipment intended for general membership use, will be accomplished using the standard Dual Tone Multi-Frequency (DTMF) tones found on 12-button keypads. Additional DTMF tones found on the 16-button keypad may be used for supervisory control.

| Frequency Band and Station Types | | | Tolerance |
|-----------------------------------|----------------|-----------------|-----------|
| HF Point-to-Point | | | |
| Other than SSB | 1605-4,000 KHz | Any Power | 10 ppm |
| | 4-29.7 MHz | Under 500 Watts | 20 ppm k |
| | | Above 500 Watts | 10 ppm |
| SSB | | | 20 Hz |
| HF Ground to Air | | | |
| Other than SSB | 1605-4,000 KHz | Under 200 Watts | 20 ppm |
| | | Above 200 Watts | 10 ppm |
| | 4-29.7 MHz | Under 500 Watts | 30 ppm |
| | | Above 500 Watts | 10 ppm |
| SSB | | | 10 Hz c |
| HF Base Station to Ground Mobiles | | | |
| Other than SSB | 1605-4,000 KHz | Under 200 Watts | 20 ppm |
| | | Above 200 Watts | 10 ppm |
| | 4-29.7 MHz | Under 500 Watts | 20 ppm k |
| | | Above 500 Watts | 10 ppm |
| SSB | | | 20 Hz |
| HF Air to Air | | | |
| SSB | 1605-4,000 KHz | | 20 Hz j |
| SSB | 4-29.7 MHz | | 20 Hz |
| HF Ground Mobiles | | | |
| Other than SSB | 1605-4,000 KHz | | 50 ppm |
| | 4-29.7 MHz | | 30 ppm |
| SSB | | | 20 Hz |

| Frequency Band and Station Types | | Tolerance |
|--|------------------------------------|--|
| Low Band VHF | 29.7-100 MHz | |
| | | Under 10 Watts 20 ppm Above 10 Watts 5 ppm |
| High Band VHF and UHF (100-470 MHz) Fixed Station | | |
| | 100-406 MHz | 5 ppm |
| | 162-174 MHz Narrowband | 3 ppm |
| | 406-470 MHz | Under 10 Watts 5 ppm q Above 10 Watts 2.5 ppm q |
| High Band VHF and UHF (100-470 MHz) Fixed Station to Air | | 20 ppm |
| High Band VHF and UHF (100-470 MHz) Airmobile | | |
| | 100-156 MHz | 20 ppm |
| | 156-174 MHz | 5 ppm s |
| | 174-406 MHz | 20 ppm |
| | 406-420 MHz | 5 ppm s |
| High Band VHF and UHF (100-470 MHz) Mobile | | |
| | 100-162 MHz | 15 ppm v |
| | 162-174 MHz | 5 ppm n |
| | 162-174 MHz (Narrowband) | 3 ppm |
| | 162-174 MHz (Narrowband Mobiles) | 5 ppm |
| | 162-174 MHz (Narrowband Portables) | 2 ppm |
| | 174-406 MHz | 15 ppm v |
| | 406-420 MHz | 5 ppm |

Footnotes:

c- 20 Hz is applicable to other than aeronautical mobile (ROUTE) frequencies.

j- The tolerance for aeronautical stations in the aeronautical mobile (ROUTE) service is 10 Hz.

k- The indicated tolerance applies to new equipment after 1/1/87. A tolerance of 30 ppm applies to other equipment.

q- Transmitter and receiver frequency tolerances: (Source: NTIA Manual Part 5.6)

| | | |
|---------------|----------------------------------|--------|
| Fixed Station | M30-50 and M162-174 | 5 ppm |
| | M406.1-420 | 2.5 |
| Mobiles | M30-50, M162-174, and M406.1-420 | 5 ppm |
| Portables | M30-50 | 20 ppm |
| | M162-174 and M406.1-420 | 5 ppm |

New standards for the new century; transmitter and receiver frequency tolerances will be:

| | | |
|---------------|-------------------------------|---------|
| Fixed Station | M138-150.8 (after 1 Jan 2008) | 1.5 ppm |
| | M162-174 (after 1 Jan 2005) | 1.5 ppm |
| | M406.1-420 (after 1 Jan 2008) | 0.5 ppm |
| | | |
| Mobiles | M138-150.8 (after 1 Jan 2008) | 2.5 ppm |
| | M162-174 (after 1 Jan 2005) | 2.5 ppm |
| | M406.1-420 (after 1 Jan 2008) | 2.0 ppm |
| | | |
| Portables | M138-150.8 (after 1 Jan 2008) | 2.5 ppm |
| | M162-174 (after 1 Jan 2005) | 2.0 ppm |
| | M406.1-420 (after 1 Jan 2008) | 2.5 ppm |
| | | |

r- This tolerance is applicable to all transmitters, including survival craft stations, after January 1, 1983.

s- Except for the RR Appendix 18 maritime mobile frequencies, where the tolerance is 20 ppm except for transmitters put in service after January 1, 1973, a tolerance of 10 ppm shall apply, and this tolerance shall be applicable to all transmitters after January 1, 1983.

v- The indicated tolerance applies to new equipment after January 1, 1987. A tolerance of 20 ppm applies to other equipment.

Table 10-1. FREQUENCY TOLERANCE (Source: NTIA Manual, Table 5.1)

Chapter 11

INTERAGENCY OPERATIONS

11-1. General. Many federal and private agencies have installed radio systems to meet their day-to-day or emergency needs. These systems range from simple VHF/UHF repeater systems designed for local operation to HF voice/data systems designed for transcontinental use. CAP has memorandums of understanding (MOU) with a number of these agencies, such as AF MARS, American Red Cross, Salvation Army, US Coast Guard Auxiliary, etc., which are on file at National Headquarters. While it is impossible to cover all such systems in this document, an overview will be provided of two of the largest programs. Any frequency used needs to be recorded on a SFAF. Detailed instructions are provided in the frequency management documents.

11-2. Use of Amateur Radio Service by CAP. The use of frequencies in the amateur radio service to conduct CAP business including SAR/DR operations is prohibited. Members with amateur radio licenses may only use CAP frequencies for CAP operations.

11-3. National Communications System (NCS) Shared Resources (SHARES) HF Radio Program. The President of the United States issued Executive Order 12742 establishing interoperability objectives for all federal departments and agencies. In response to this order, the NCS established a program to identify federal HF radio assets and develop procedures to enable these resources to be used to pass National Security Emergency Preparedness (NSEP) traffic. CAP was a major participant in the development and fielding of this program.

a. Concept of Operations. Federal entities rely on the public telephone system to conduct the government's day-to-day business. In emergency situations requiring coordinated federal response, the telephone system is expected to experience disruption and traffic congestion. Contingency communications must be available in such circumstances. Agencies participating in the SHARES program have agreed to use their existing HF radio systems to pass emergency traffic for other agencies on a non-interference basis with their own missions.

b. Procedures for Use. CAP stations will normally be contacted on our assigned frequencies by other federal agencies and asked to pass SHARES traffic. Since it is impractical to provide federal agencies with a list of all CAP stations, they will normally call us as follows - "ANY CAP STATION THIS IS (THEIR CALL SIGN) WITH SHARES TRAFFIC." Unless the CAP stations on frequency are handling PRIORITY or higher precedence traffic, they will be expected to take and make every effort to pass the SHARES traffic. In most cases, the

traffic will be addressed to distant states and require multiple relays through the CAP network to get to the addressee. CAP stations are authorized to use any CAP/CAP-USAF frequency assigned to any region to pass this traffic. CAP stations are also authorized to access specified frequencies of other participating federal agencies to pass this traffic if it cannot be passed on our frequencies. Each region DCS communications and wing director of communications has been furnished with a directory listing these federal frequencies and will distribute them as appropriate. The Federal Government has identified this information as "FOR OFFICIAL USE ONLY" and release to non-CAP personnel may only be authorized by HQ CAP-USAF/DOK.

c. Message Forms. All participating agencies have agreed to utilize the standard message form in passing SHARES traffic. This form may be reproduced locally, but not modified. All operators are reminded that, while you may add clarifying routing instructions to the heading of a message, and, if necessary operator notes to the end of a message, no one is authorized to change any part of the message itself; you relay it exactly as received.

d. Tests and Exercises. The federal frequencies used to support SHARES are also used daily by federal agencies to support essential government operations. CAP stations are not authorized on these frequencies to conduct radio checks. All CAP participation in SHARES tests and exercises will be coordinated, in advance, by HQ CAP-USAF/DOK.

e. Participation Requirements. CAP radio stations that are also designated SHARES stations must participate in at least one exercise or actual disaster in each calendar year. CAP-SHARES stations who do not meet this minimum requirement may lose their authorization to participate in SHARES.

11-4. National Emergency Communications Network (NECN). This net is designed to provide backup command and control communications to support the Federal Response Plan. All CAP stations are authorized to participate (CAP participation in exercises may be restricted).

11-5. CAP Participation in Other Agencies' Communications Programs. CAP stations operating on non-CAP frequencies must have written authorization from the licensed agency. A copy of the FCC license or the federal authorization must also be obtained. The letter (copy or original) and radio information are combined with a SFAF and sent through channels to HQ CAP/DOK. (The original letter may be kept on file at the wing level.)

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SUMMARY OF CHANGES

Changed from a manual to a regulation. Complete revision.